FIVE CHOICE SERIAL REACTION TIME TASK

SOF-700RA-8A

USER'S MANUAL

DOC-026
Rev. 1.3

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Med Associates Inc.
P.O. Box 319
St. Albans, Vermont 05478

Phone: 802.527.2343
Fax: 802.527.5095
www.med-associates.com

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notes

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CHAPTER 1 | INTRODUCTION

The purpose of this manual is to give an explanation of the MED State Notation™ Procedures that comprise the SOF-700RA-8A Five Choice Serial Reaction Time Procedure. The files in this package can be found on the disk provided by MED Associates, Inc.

These procedures are intended to be run in MED Associates MED-PC® IV software. The latest version of MED-PC® IV gives researchers the ability to use pre-programmed procedures such as these to make hardware control and data collection easy. These pre-programmed procedures can also be modified to meet the evolving demands of a research protocol. Again, it is the intent of this manual to explain exactly what these procedures implement, and provide guidance into how to interpret what the program code achieves in order to let the user determine how to modify them to match their research protocol demands. The manual provides some examples of editing and modifying the procedure's programming code. The manual also defines the elements in the raw data file produced by these procedures.

In addition to this manual, refer to the **MED-PC® IV User's Manual** for the installation of the MED-Associates interface drivers, the MED-PC IV Software, and the Delphi® Compiler. Also refer to the User's Manual for instructions on developing a Hardware Configuration. Data file structure, file-saving format, and other related options are also determined by the Hardware Configuration. Running the Hardware Configuration software utility that accompanies MED-PC IV sets the Hardware Configuration. Its purpose is to assign the inputs and outputs on the interface cards in the interface cabinet for each task controlled by MED-PC IV. The particular type of interface card that is supplied in the interface cabinet may vary; please refer to the User's Manual provided for instructions on how to configure the type of card that is in the cabinet. A valid Hardware Configuration must exist in order for MED-PC IV to interface correctly with the MED Associates, Inc. hardware. This means that one should take the time to create a valid Hardware Configuration before attempting to run the procedures included in this package.

Should there be any problems, the staff at MED Associates, Inc. is available to answer any questions that may arise. Please e-mail us at support@med-associates.com with a detailed description of the problem or desired goals so that concise and detailed information may be provided.

The Five Choice Serial Reaction Time procedure is designed to be as easy to use as possible. MED Associates, Inc. understands that researchers do not have the time to devote to programming and hardware design, and for that reason, we have undertaken that burden for you. We sincerely hope that you are satisfied with the products and services we provide, and look forward to meeting your future experimental needs as your research program evolves.

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Overview of the Procedure

The test animal is required to respond to brief flashes of light presented randomly in one of five spatial locations. (Testing with fewer than five locations is also possible and is covered in the **Modifying the MedState Notation™ Code** section of this manual.) Testing begins with the onset of the House Light and the Pellet or Dipper Receptacle Light.

A response issues a Free Reward Presentation and initiates the Session Timer. Following the Reward Interval an ITI is activated for the first Trial. Responses during the ITI result in a Time Out and are recorded as a Premature Response. Time Outs also occur following an Incorrect Response, or following an Error of Omission (failure to respond within the Limited Hold Interval). Responses during the Time Out reset the Time-Out Timer. The house light is turned off during a Time Out.

A correct response turns the receptacle light on; however, the Reward Duration time does not start until a head entry is made. Spurious head entries are counted during all intervals. Twenty elements of data are recorded for each trial. Responses are counted in six summary elements plus total head entries. The percentage of correct, incorrect, and omissions is calculated, as is average latency to correct responses, average latency to incorrect responses, and average latency to reward.

By default this procedure runs for 50 trials or 30 minutes starting with a fixed ITI Interval of 5 seconds and fixed Stimulus Duration of 0.5 seconds. Both the ITI and the Stimulus Duration can be randomized by adding to the LIST statements (see **Modifying the MedState Notation™ Code)**. If the session should continue through the last trial regardless of the amount of time it takes, simply set the session time to some excessive value such as 999. The maximum number of trials that can be run is 250 due to the size of the "K" array; however, this can be easily changed to accommodate additional trials.

The variable values are set to the following default values (see **Viewing/Changing Variable Values** to change these values).

Table 1.1 - Default Variable Values

Variable	Default Value
Trials to Run (maximum of 250)	50 (10 presentations at each stimulus location)
Response (Limited Hold) Time (seconds)	5
Time Out (seconds)	5
Reward (1 = Pellet; 2 = Dipper)	1
Reward Duration (seconds)	2
Session Time (minutes)	30

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CHAPTER 2 | SOFTWARE INSTALLATION

Software Installation

Please refer to the **MED-PC IV User's Manual** for a complete guide to installing the MED-PC IV software, building a valid Hardware configuration with the Hardware Configuration utility, and opening and compiling a MSN procedure in the Trans-IV utility.

To install the Five Choice Serial Reaction Time Task Procedure, insert the CD into the CD-ROM drive and click **Install the 5 Choice Serial Reaction Time Software**. The procedure is copied into the C:\MED-PC IV\MPC folder.

Backing Up the Software

Med Associates strongly encourages creating backup copies of the programs in case of disk failure. Having copies of the original programs may be useful in the future should modifications be made to the existing programs.

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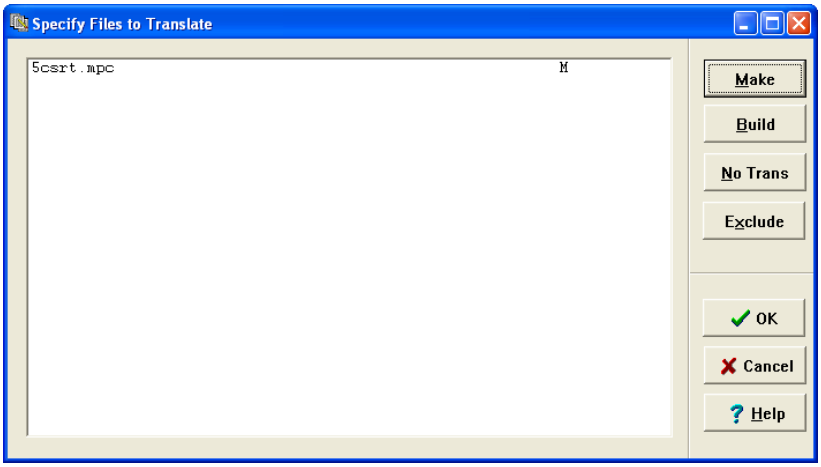
CHAPTER 3 | BEGINNING & RUNNING AN EXPERIMENT

Translating the MED-PC IV (.mpc) File

Programs written in MedState Notation must be translated using Trans IV before they can be executed in this application. Be sure that a copy of the file being translated is present in the directory "C:\MED-PC IV\MPC\." Open Trans IV icon and select **Translation** | **Translate and Compile**.

Select the program(s) to use for the experiment and click **Make**. Click **OK** to start the translator, and it will automatically parse the MedState Notation and then open to a DOS screen to compile the Pascal code. Depending on the speed of the computer, each of these steps may not be seen. If any problems are encountered during this process, refer to the on-screen help menu or the **MED-PC Version IV User's Manual**, or contact MED Associates, Inc. for assistance.

Figure 3.1 - Trans IV Control Panel for Translating and Compiling MedState Notation Code



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Using the MED-PC IV Load Wizard

MED-PC IV is designed to help the researcher run an experiment by guiding selection choices through its Experiment Loading Wizard. This section will describe how to initiate the 5CSRT.mpc application, however the following steps that will also apply to all other .mpc procedures.

Open MED-PC IV and the MED-PC Experiment Loading Wizard's Welcome screen, shown in Figure 3.2 will appear.

Figure 3.2 - The MED-PC IV Loading Wizard Welcome Screen

MED-PC Experiment Loading Wizard
Welcome
This wizard will guide you through starting experiments and setting session parameters.
Run this expert automatically when starting MED-PC.
Close
Next

To avoid this load wizard, deselect the checkbox labeled **Run this experiment automatically when starting MED-PC**. Close this screen by clicking the **Close** button. Closing this screen immediately reveals the MED-PC Run-Time Screen shown in Figure 3.9. If the choice to continue with the Loading Wizard is made, then click the **Next** button.

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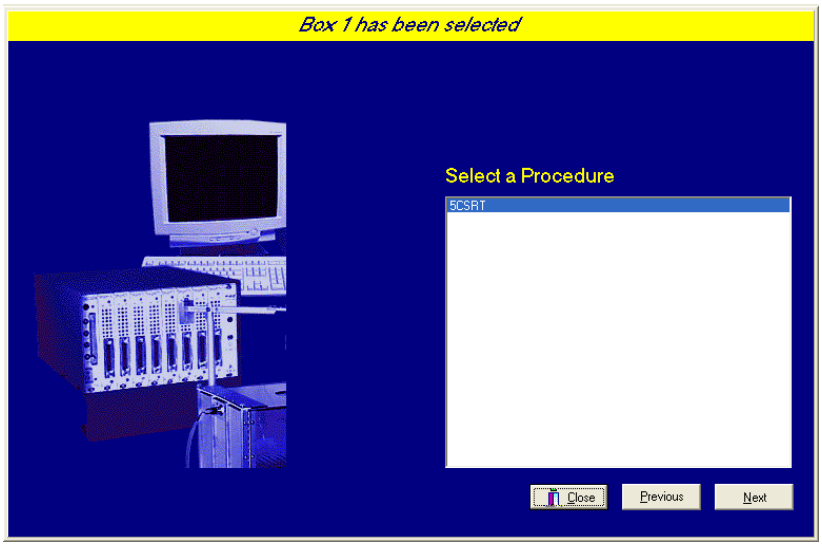
The Box Selection screen will appear next, as shown in Figure 3.3. From this screen the researcher chooses which boxes will be used in the experiment. Select the boxes that will run the experiment by clicking in the radio button next to the box number. The figure shows that the Hardware Configuration included only 1 box, which was selected. Click **Next** to continue.

Figure 3.3 - The Box Selection Screen

The Select a Procedure screen appears next, as seen in Figure 3.4. This is where the application to be run is selected. The screen displays a list of all the currently compiled procedures. Select the desired procedure and then click **Next**.

Figure 3.4 - The Select a Procedure Screen



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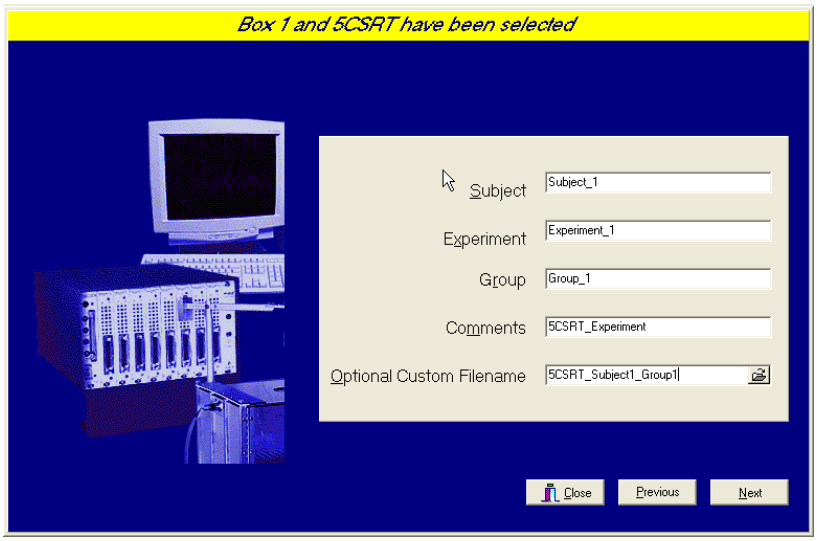
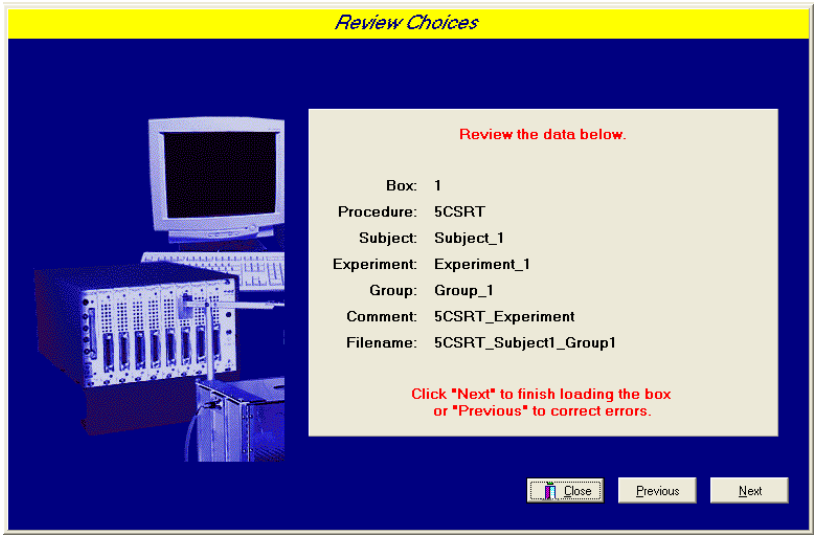
The Enter Experiment Data Screen should display next, as shown in Figure 3.5. The purpose of this screen is to allow annotations to be added to the data file that is produced by MED-PC IV. These annotations will help identify the Subject, Experiment, and Experiment Group upon which data was collected. Comments can be added here as well, and the data file can be given a customized file name to help identify it from other data files. Enter the information desired, and click **Next**.

Figure 3.5 - Enter Experiment Data Screen



The next screen to appear is the Review Choices screen, as seen in Figure 3.6. This is a method of confirming that the information received from the Box/Procedure Selected is correct. If it is not correct, select **Previous**, and edit the data. If it is correct, select **Next**.

Figure 3.6 - Review Choices Screen



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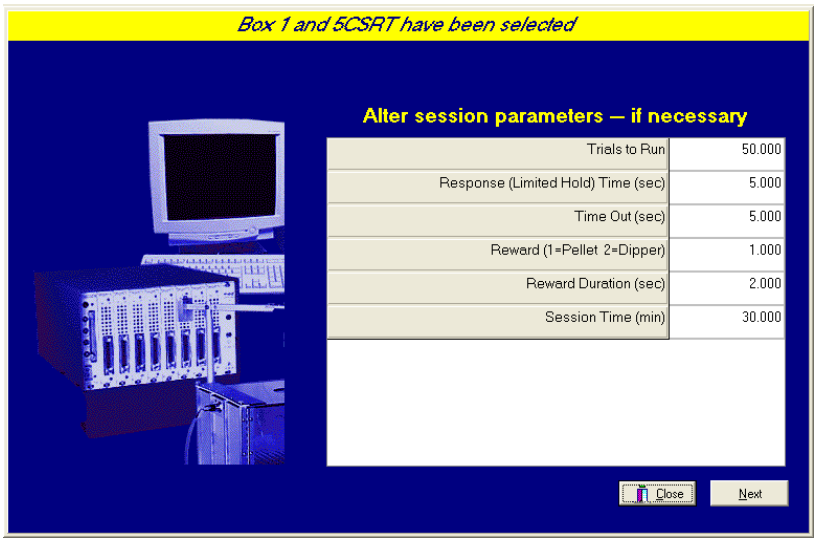
The Alter Session Parameters Screen, shown in Figure 3.7, is the next screen to appear, and is an important screen for the researcher. The Alter Session Parameters screen allows the researcher to alter the parameters by which a procedure executes. The Send Start Command Screen appears next. The options available on the screen vary depending upon how many boxes are described in the Hardware Configuration.

Figure 3.7 - Alter Session Parameters Screen


Box 1 and 5CSRT have been selected
Alter session parameters – if necessary
Trials to Run 50.000
Response (Limited Hold) Time (sec) 5.000
Time Out (sec) 5.000
Reward (1=Pellet 2=Dipper) 1.000
Reward Duration (sec) 2.000
Session Time (min) 30.000
Close
Next

In this example only 1 box is described in the Hardware Configuration, so Figure 3.8 will appear next. If more than 1 box is in the Hardware Configuration, then Figure 3.9 will appear.

Figure 3.8 - Send Start Command Screen for Single Box Configuration

Load More Boxes or Send Start Command?
I want to send start signals to already loaded boxes
I am finished with the wizard
Close
Continue

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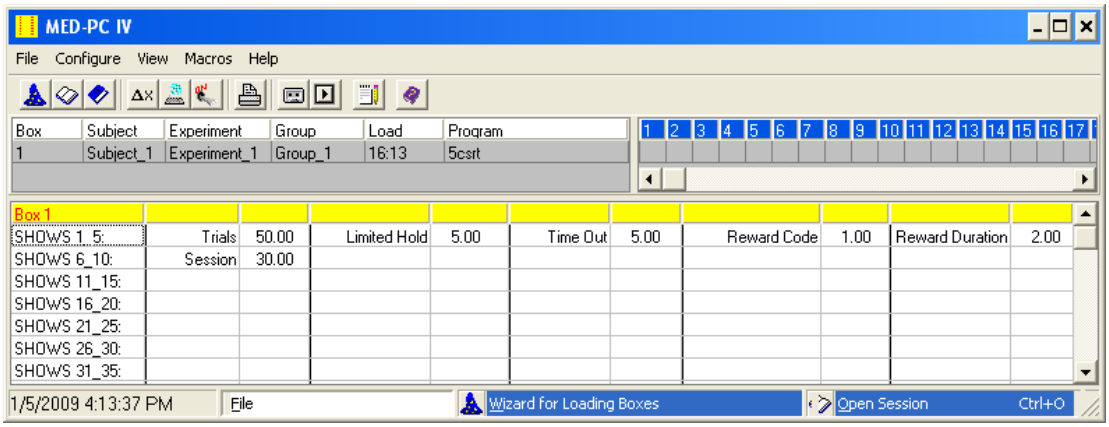
Figure 3.9 - Send Start Command Screen for Multiple Box Configuration

Load More Boxes or Send Start Command?
I want to load more boxes
I want to send start signals to already loaded boxes
I am finished with the wizard
Close
Continue

In both cases (Figure 3.8 and Figure 3.9), the screens are where the researcher decides to either load more boxes, send a start signal to boxes that are already loaded, or enter the MED-PC IV run-time environment without sending a start signal by selecting "I am finished with the wizard". This option results in the screen shown in Figure 3.10.

Figure 3.10 - The MED-PC IV Run-Time Screen


MED-PC IV
File Configure View Macros Help
Box Subject Experiment Group Load Program
1 Subject_1 Experiment_1 Group_1 16:13 5csrt
Box 1
SHOWS 1_5: Trials 50.00 Limited Hold 5.00 Time Out 5.00 Reward Code 1.00 Reward Duration 2.00
SHOWS 6_10: Session 30.00
SHOWS 11_15:
SHOWS 16_20:
SHOWS 21_25:
SHOWS 26_30:
SHOWS 31_35:
1/5/2009 4:13:37 PM File Wizard for Loading Boxes Open Session Ctrl+O

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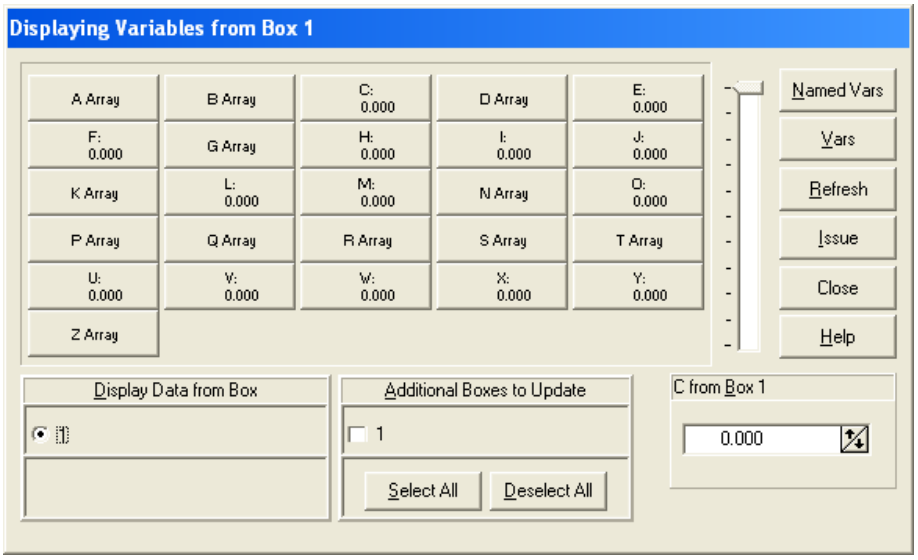
Viewing/Changing Variable Values

Before a "start command" has been issued, any variable may be changed on the MED-PC IV run-time screen. Simply highlight the value to change, and then enter the new value. Once a session is in progress, change variables by selecting **Configure** | **Change Variables**, or click the 4th tool bar item **ΔX**. In the lower left hand corner of the Change Variables window, find the "Display Data from Box" display, and choose the chamber(s) to modify. By clicking additional boxes in the "Additional Boxes to Update" section, changes made to a single box are automatically loaded to all of the selected boxes.

Figure 3.11 - Changing Variables Screen



The value of any simple variable may be viewed from this screen by clicking an array on the table and each element in that array can be viewed, as shown in Figure 3.12. To change a value, simply highlight and replace the value in the lower right hand box or use the up/down arrows to increment by 1. Click the **Issue** button for the change to take effect. Click **Named Variables** to produce the display in Figure 3.13. Change variables here as needed.

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Figure 3.12 - Displaying Array A from Box 1

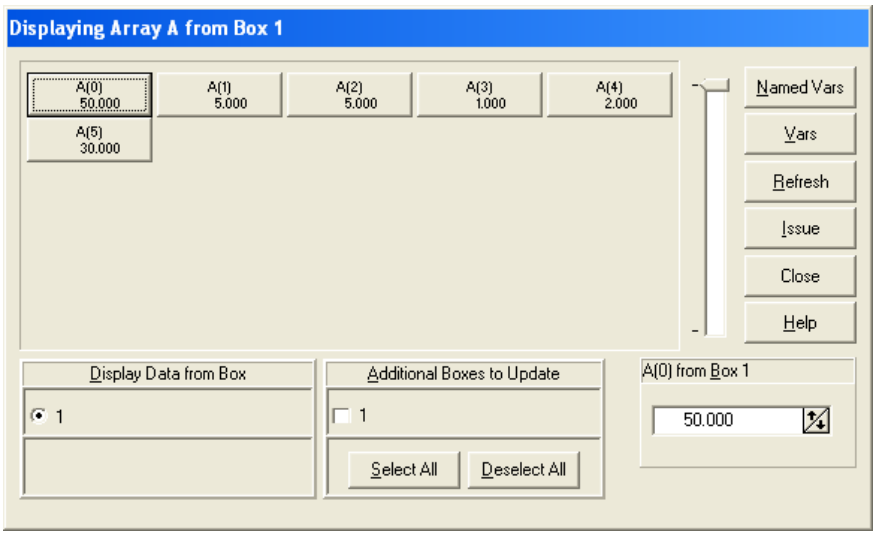
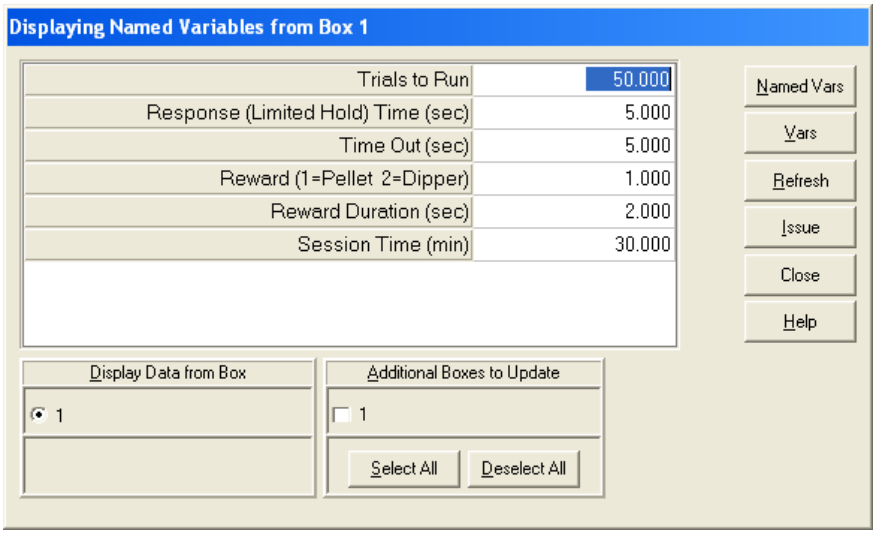


Figure 3.13 - Displaying Named Variables from Box 1



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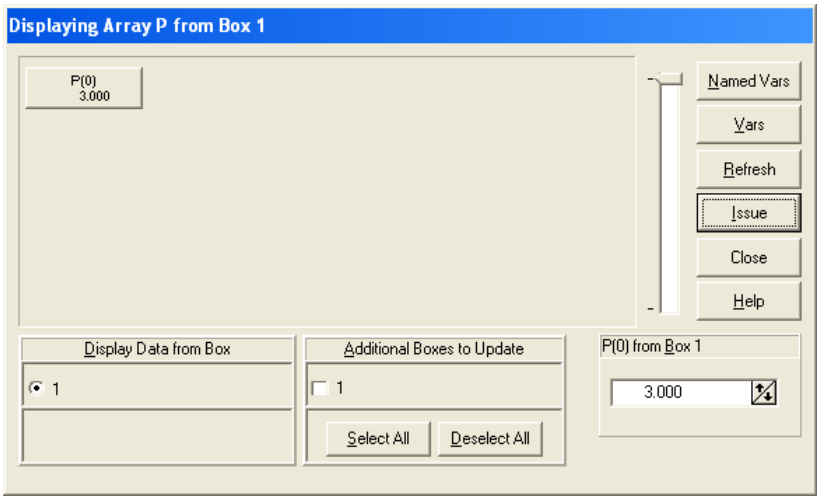
Changing Stimulus Duration and ITI Variables

Arrays were used to control stimulus duration and ITI durations, because it may be desirable to randomize multiple values of one or the other or both. The default stimulus duration for each stimulus location has been placed in an individual array in order to produce a balanced design when using multiple durations. The stimulus duration value for Stimulus 1 is in the P Array. To change this value, click the P Array button on the Change Variables screen (Figure 3.11) to produce the display in Figure 3.14. Highlight and replace the value in the lower right hand box. Click "Issue" for the change to actually take effect.

Figure 3.14 - Changing the Duration of Stimulus 1



In Figure 3.14, the value of the stimulus duration for location 1 has been changed to 3 seconds. To change all locations to the same value you must repeat this procedure for arrays Q, R, S, and T. If you plan to run the same time for many sessions, it is more efficient either to edit the code and retranslate it with a new file name or to create a macro as illustrated below. Use the same procedure to change the ITI value(s) in the Z Array.

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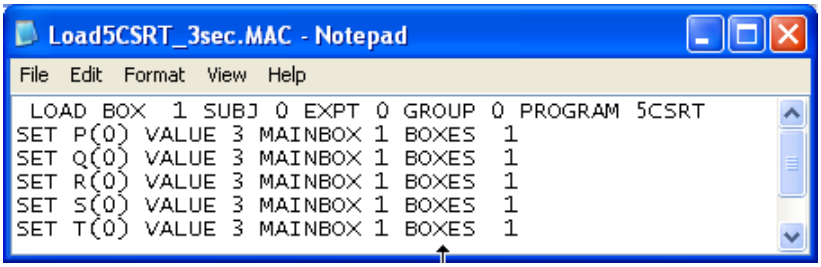
Macros

The simplest way to initially create a macro is to record keyboard functions while performing the steps manually. Once the commands are in the macro, it is easy to create a number of macros with the macro editor. The following example illustrates the process of loading "Box 1" and changing the Stimulus Duration to 3 seconds.

To begin, open MED-PC IV and going directly to the run time screen. Close the load wizard, if present. Before loading or opening the procedure, click **Macro** on the main menu and select **Turn On Macro Recorder** or click the 8th tool bar item with the cassette tape icon on top. A note on the bottom of the display indicates that the recorder is running. Open "5CSRT.mpc" by clicking **Files** | **Open Session**. Change the variables using any of the methods described above. When all settings have been made, turn the recorder off again by using the main menu or tool bar. Save the macro with a distinctive name. The example in Figure 3.15 was named "Load5CSRT_3sec.mac" since the stimulus duration was changed to 3 seconds.

Figure 3.15 – Load5CSRT_3sec.mac


Load5CSRT_3sec.MAC - Notepad
File Edit Format View Help
LOAD BOX 1 SUBJ 0 EXPT 0 GROUP 0 PROGRAM 5CSRT
SET P(0) VALUE 3 MAINBOX 1 BOXES 1
SET Q(0) VALUE 3 MAINBOX 1 BOXES 1
SET R(0) VALUE 3 MAINBOX 1 BOXES 1
SET S(0) VALUE 3 MAINBOX 1 BOXES 1
SET T(0) VALUE 3 MAINBOX 1 BOXES 1

Once this macro is built, use the macro editor to make simple changes such as replacing all 3-second values with 5-second values. Review the Help file on screen or the User's Manual for more information on macros and the features offered. A START command or message box followed by a START command could be added to the macro. It was left off here so changes could be verified before starting the procedure.

Modifying the MedState Notation™ Code

Permanent changes to the MedState Notation code. To make the same change to the stimulus duration as shown above, do the following. Open Trans IV and select **File** | **Open** to place 5CSRT.mpc into the text editor. Scroll down to approximately line 133 (note the line counter in the lower right hand corner of the editor) to reveal the code shown in Figure 3.16.

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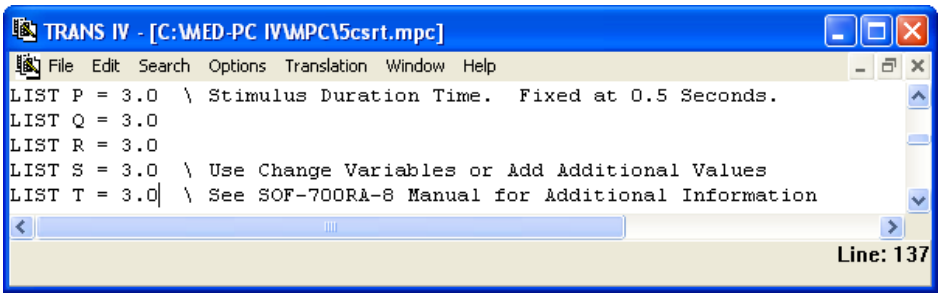
Figure 3.16 – 5CSRT.mpc Line 133

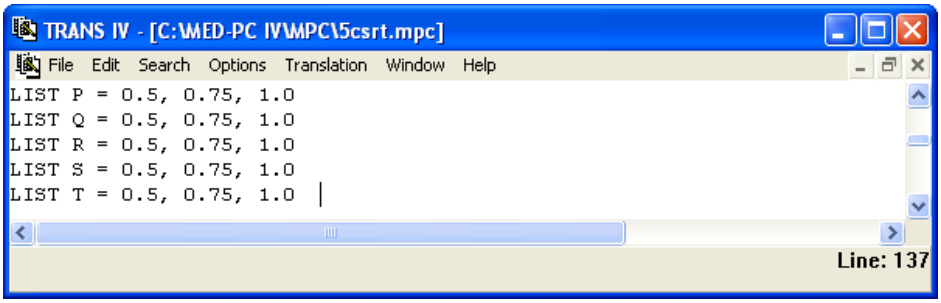

TRANS IV - [C:\MED-PC IV\MPC\5csrt.mpc]
File Edit Search Options Translation Window Help
LIST P = 3.0 \ Stimulus Duration Time. Fixed at 0.5 Seconds.
LIST Q = 3.0
LIST R = 3.0
LIST S = 3.0 \ Use Change Variables or Add Additional Values
LIST T = 3.0 \ See SOF-700RA-8 Manual for Additional Information
Line: 137

Change each "0.5" value to "3.0" and save the changes with the same or a new file name such as 5CSRT_3.mpc. Remember a new .mpc file name is created and are a macro is being used to load boxes, the file name in the macro also must be changed. Translate and compile the new or changed file as described previously and run MED-PC IV. Use the Change Variables screen to view/confirm the new values.

Using Multiple Stimulus Duration Times

Running multiple stimulus values is also a simple editing change to the code. Simply add the additional values to the LIST statement as shown in Figure 3.17.

Figure 3.17 - MSN Code from 5CSRT.mpc with Multiple Stimulus Durations


TRANS IV - [C:\MED-PC IV\MPC\5csrt.mpc]
File Edit Search Options Translation Window Help
LIST P = 0.5, 0.75, 1.0
LIST Q = 0.5, 0.75, 1.0
LIST R = 0.5, 0.75, 1.0
LIST S = 0.5, 0.75, 1.0
LIST T = 0.5, 0.75, 1.0
Line: 137

The new arrays are automatically dimensioned and the values drawn at random for each new trial. If the total number of trials is an even multiple of 5 times the number of duration values, an equal number of trials at each value and location runs. The duration factor may be analyzed by exporting data from the D Array to Microsoft Excel™ and sorting by duration. The MED Associates' utility MPC2XL may be useful if exporting data from multiple files or partial data.

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Using Less Than Five Nose Pokes

Running fewer than five Nose Pokes is sometimes desirable, especially during training. The editing, translating, and compiling process is the same as described above. The critical code may be found around line 125, where the following may be found:

```
LIST N = 1,2,3,4,5
```

The stimulus location for each trial is drawn from this list, so the follow changes are appropriate.

Example 1:

```
LIST N = 3
```

This runs a single stimulus in the center nose poke only. Note that in some instances it is also desirable to physically cover the unused nose pokes. Cover plates are available for this purpose on request.

Example 2:

```
LIST N = 2,3,4   \ Run with the three adjacent center locations
```

Example 3:

```
LIST N = 1,3,5   \ Run three locations using every other stimulus
```


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CHAPTER 4 | UNDERSTANDING THE DATA FILES

Unless otherwise specified, data will be saved to C:\MED-PC IV\DATA. Data can be saved manually by selecting **FILE | SAVE DATA MANUALLY** or **FILE | SAVE DATA (FLUSH)**. The file name that is used to save the data in depends on the option that was chosen in the Hardware Configuration Utility and may also be dependent on the Subject, Experiment, and Group name provided in the MED-PC IV load wizard. Within each data file, the headings are created for each Subject, Experiment, Group, Box, etc., (see below). Data files may be opened with note pad, word pad, or any word processor or spreadsheet; however, be sure they are always saved "unformatted" in case a data extraction utility such as MED-PC to Excel might ever be used. Data file formats are explained in detail in the **MED-PC IV User's Manual**.

Sample Data File

Select **Annotated** on the file options page during hardware installation to produce a raw data file similar to the following. Data files are located in C:\MED-PC IV\Data\ unless an alternate path was defined during hardware installation. They may be opened with note pad, word pad, or any word processor; however, make sure they are always saved unformatted in the occasion a data extraction utility such as MPC2XL is used. The header information should be self-explanatory. Data-file formats are explained in detail in the **MED-PC IV User's Manual**.

```
File: C:\MED-PC IV\DATA\!2003-02-12_10h26m.Subject 0

Start Date: 02/12/03
End Date: 02/12/03
Subject: 0
Experiment: 0

Group: 0
Box: 1
Start Time: 10:26:23
End Time: 10:29:30
MSN: 5CSRT
C:  0.00
E:  0.00
F:  0.00
H:  0.00
I:  0.00
J:  0.00
L:  0.00
M:  0.00
O:  0.00
U:  0.00
V:  0.00
W:  0.00
X:  0.00
Y:  0.00


A:
     0:   50.00   5.00   5.00   1.00   2.00  30.00
```


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```
B:
     0:  50.00 500.00 500.00   0.00 200.00 158.00   4.51   2.00 100.00 500.00

D:
     0:   5.00   3.00   1.00   2.00   2.00   4.00   5.00   0.00   0.00   0.00
    10:  55.56  33.33  11.11
G:
     0:   3.05   1.41   6.33   0.00   0.00  15.26   4.23  31.63
K:
     0:   1.00   3.00   3.00   3.03   0.00   8.59   0.00   0.00   0.00   0.00
    10:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   1.00   5.00
    20:   2.00   7.00   3.00   0.00   2.70   0.00   0.00   0.00   0.00   0.00
    30:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   5.00
    40:   3.00   1.00   1.00   2.38   0.00  10.17   0.00   1.00   1.00   0.00
    50:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   1.00   5.00
    60:   4.00   4.00   0.00   0.00   0.00   0.00   1.00   0.00   0.00   0.00
    70:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   5.00
    80:   5.00   6.00   6.00   3.01   0.00   5.72   0.00   0.00   0.00   0.00
    90:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   1.00   5.00
   100:   6.00   8.00   8.00   3.30   0.00   2.64   0.00   0.00   0.00   0.00
   110:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   1.00   5.00
   120:   7.00   9.00   1.00   0.00   0.14   0.00   0.00   0.00   0.00   0.00
   130:   0.00   0.00   0.00   0.00   0.00   0.00   3.00   0.00   1.00   5.00
   140:   8.00   5.00   4.00   0.00   1.39   0.00   0.00   0.00   0.00   0.00
   150:   0.00   0.00   0.00   0.00   0.00   0.00   3.00   0.00   1.00   5.00
   160:   9.00   2.00   2.00   3.54   0.00   4.51   0.00   0.00   0.00   0.00
   170:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   1.00   5.00
N:
     0:   1.00   2.00   3.00   4.00   5.00
P:
     0:   1.00
Q:
     0:   1.00
R:
     0:   1.00
S:
     0:   1.00
T:
     0:   1.00

Z:
     0:   5.00   5.00   5.00
```


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Breakdown of Sample File - Simple Variables

The following simple variables are shown immediately following the header information:

```
C:   0.00
E:   0.00
F:   0.00
H:   0.00
I:   0.00
J:   0.00
L:   0.00
M:   0.00
O:   0.00
U:   0.00
V:   0.00
W:   0.00
X:   0.00
Y:   0.00
```

There are no simple variable used in this application and so unused the elements are reported with value “0”.

Breakdown of Sample File - Arrays

The arrays are presented in rows of 10 elements each. The first row begins with element 0 and ends with element 9, the second row begins with element 10 and ends with element 19, etc. Each row begins with an element marker followed by a colon, 0:, 10:, 20:, 30:, etc. The number of elements or columns in each row is controlled by the command DISKCOLUMNS = 10 found at line 154 of the MedState Notation code. Ten elements per row were selected because in array K there are 20 elements per trial. Unused elements in summary data files could be used to meet future requirements. Array size may be expanded with the DIM commands found prior to State Set 1.

Each array has been defined in the comments section at the beginning of the .mpc file. That information was used to add the following labels to each array. The lines were expanded to make room for the labels. See the **MPC2XL User’s Manual** for producing labeled data files with all or just some of the information below.

Array A

Array A contains the control variable values. The values are preset to default values in State Set 1, State 1. They are displayed as named variables and can be changed by any of the methods described previously. Once a session is started these values should not be changed to insure the integrity of the experiment.

```
A:

     0:   50.00   5.00   5.00   1.00   2.00  30.00
```


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Array A with Labels

Row Marker	A(0) Trials to Run	A(1) Limited Hold	A(2) Time Out	A(3) Reward Code	A(4) Reward Duration	A(5) Session Time
0:	50	5	5	1	2	30

Array B

Array B parallels Array A and is used for the working variables that may change as the session runs. For example, the element for Trials is incremented by one for each trial. At the end of the session, the value will be the same as the A element unless the experiment ran out of time. The session time in the B Array is incremented in seconds while the value in the A array is set in minutes. The time elements for limited hold, time out and reward duration are in MED clock units. Since this example was run with a resolution setting of 10 ms, the values in the B Array are 100 times the values in the A Array, which are in seconds.

```
B:
     0:   50.00 500.00 500.00   0.00 200.00   158.00   4.51   2.00   100.00
```

Array B with Labels

Row Marker	B(0) Trials to Run	B(1) Limited Hold	B(2) Time Out	B(3) Not Used	B(4) Reward Duration	B(5) Session Time	B(6) Latency Time	B(7) Stimulus Location	B(8) Stimulus Duration
0:	50	500	500	0	200	158	4.51	2	100

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Array D

Array D contains some summary information. The counters in elements D(0) through D(6) provide total responses broken down by category, as well as head entry counts. To see exactly when each counter is incremented, run "Find" or "Search" in the Medstate Notation text file on the element label. For example, a search on "D(0)" takes you to any statement in which a correct response is incremented or displayed. The values in elements D(10) through D(12) are calculated at the end of each trial and are displayed as a percentage. Adding these three numbers together should total 100%. Rounding could cause it to be off by +/- 0.01. In the sample file of 50 trials there were 28 correct and 17 incorrect responses with five trials of omission, or 56.00% correct, 34.00% incorrect, and 10.00% omission. There were also 2 premature responses, 2 perseverant responses, 4 time out responses, and 5 head entries.

```
D:
     0:  28.00  17.00   5.00   2.00   2.00   4.00   5.00   0.00   0.00   0.00
    10:  56.00  34.00  10.00
```

Array D with Labels

Row Marker	D(0) Correct Responses	D(1) Incorrect Responses	D(2) Omissions	D(3) Premature Responses	D(4) Perseverant Responses	D(5) Time Out Responses	D(6) Head Entries	D(7) Not Used	D(8) Not Used	D(9) Not Used
0:	28	17	5	2	2	4	5	0	0	0

Row Marker	D(10) Percent Correct	D(11) Percent Incorrect	D(12) Percent Omission
10:	56.00	34.00	10.00

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Array G

Array G contains additional summary data. G(0), G(1), and G(2) contain the average latency to correct, incorrect, and omissions respectively. G(5), G(6), and G(7) contain the total latency times from which the averages were computed, but otherwise provide no additional information. For example, the value of G(0), 0.55, is the result of dividing the total latency time in G(5), 15.26, by the total number of correct responses in D(0), 28. The number of decimals shown is controlled by the DISKFORMAT command inserted into the code prior to State Set 1.

```
G:
      0:    0.55    0.25    6.33    0.00    0.00   15.26    4.23   31.63
```

Array G with Labels

	G(0)	G(1)	G(2)	G(3)	G(4)	G(5)	G(6)	G(7)
Row Marker	Average Latency Correct	Average Latency Incorrect	Average Latency Reward	Not Used	Not Used	Total Latency Correct	Total Latency Incorrect	Total Latency Reward
0:	0.55	0.25	6.33	0	0	15.26	4.23	31.63

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Array K

Array K contains trial-by-trial information. A total of 20 elements are assigned to each trial and are displayed in two rows. Only the data from the first four trials is shown below. By comparing the stimulus location with the location of the first response you can tell what type of trial each was. The locations match for the correct trials 1 & 3 and do not match for incorrect trial 2. In trial 4, the response location is 0 indicating an omission trial. To view only those trials that meet a specific criterion, place this data in a spreadsheet with one row per trial and sort to extract all correct or incorrect trials, all trials in a particular location, or trials by stimulus duration when using multiple durations.

```
K:
     0:   1.00   3.00   3.00   3.03   0.00   8.59   0.00   0.00   0.00   0.00
    10:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   1.00   5.00
    20:   2.00   7.00   3.00   0.00   2.70   0.00   0.00   0.00   0.00   0.00
    30:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   5.00
    40:   3.00   1.00   1.00   2.38   0.00  10.17   0.00   1.00   1.00   0.00
    50:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   1.00   5.00
    60:   4.00   4.00   0.00   0.00   0.00   0.00   1.00   0.00   0.00   0.00
    70:   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   1.00   5.00
```

Array K with Labels

Row Marker	K(0) Trial Number	K(1) Stimulus Location	K(2) First Response	K(3) Correct Latency	K(4) Incorrect Latency	K(5) Reward Latency	K(6) Omission Error	K(7) Perseverant NP #1	K(8) Perseverant NP #2	K(9) Perseverant NP #3
0:	1	3	3	3.03	0	8.59	0	0	0	0
	K(10) Perseverant NP #4	**K(11)** Perseverant NP #5	**K(12)** Not Used	**K(13)** Not Used	**K(14)** Not Used	**K(15)** Not Used	**K(16)** Premature Response	**K(17)** Head Entries	**K(18)** Cue Duration	**K(19)** ITI Duration
10:	0	0	0	0	0	0	0	1	1	5
20:	2	7	3	0	2.7	0	0	0	0	0
30:	0	0	0	0	0	0	0	0	1	5
40:	3	1	1	2.38	0	10.17	0	1	1	0
50:	0	0	0	0	0	0	0	1	1	5
60:	4	4	0	0	0	0	1	0	0	0
70:	0	0	0	0	0	0	0	0	1	5

Array N

Array N contains a list of stimulus locations.

```
N:
   0:   1.00   2.00   3.00   4.00   5.00
```


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Arrays P through T

Arrays P through T contain the lists of cue durations for nose pokes 1 through 5.

```
P:
     0:    0.50
Q:
     0:    0.50
R:
     0:    0.50
S:
     0:    0.50
T:
     0:    0.50
```

Array Z

Array Z contains the list of ITI durations.

```
Z:
     0:    5.00    5.00    5.00
```

Appendix A | Contact Information

Please contact MED Associates, Inc. for information regarding any of our products.

Visit our website at www.med-associates.com for contact information.

For technical questions, email support@med-associates.com.

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